

CATALOGUE OF THE CLAUSILIIDÆ OF THE JAPANESE EMPIRE.<sup>1</sup>

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The general sequence of species in the following list is from primitive to specialized forms; but this end is only imperfectly attained, as there are several highly specialized groups terminating wholly independent phyla, making a serial arrangement quite arbitrary. The forms with narrow clausilium and several palatal plicæ in place of a lunella are the more primitive, retaining the structure of early Tertiary groups. *Megalophaedusa* and the typical *Hemiphaedusa* are of this kind. *Zaptyx*, *Luchuphaedusa* and *Tyrannophaedusa* seem to be three independent specializations from an early Hemiphaedusan stock. *Stereophaedusa* stands a little more remote; while *Pseudonenia*, *Euphaedusa* and *Reinia* probably separated from the pro-Hemiphaedusan stock at a still earlier period.

The East Asiatic *Clausiliidæ* are much more closely related to early Tertiary than to modern European groups. The evidence indicates that, like the Belogonous *Helicidæ*, a common stock of *Clausiliidæ* spread over Asia and Europe, at least as early as the Eocene. Subsequent evolution has been along independent lines in the East and the West; and just as I have demonstrated in the *Helicidæ*, the European stock has forged ahead, while the Oriental looks backward, many a group retaining old characters.

Ninety-three well-established species of *Clausilia* are now known from Japan, more than half of them first described in this journal. Of this number forty-four were brought to light by Mr. Hirase. The localities of many others, previously uncertain, have been ascertained from specimens collected by him. In addition to these species, thirty-five subspecies or varieties have been described. The list of species is encumbered with eleven additional specific names, standing for forms so inadequately described that their relationships with other species are not ascertainable from published

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<sup>1</sup> Exclusive of Formosa.

data, though part of them can be identified specifically when specimens from the original localities come to competent hands.

Section MEGALOPLEDUSA Bttg.

- C. MARTENSI 'Herklots' v. Mart. (= *C. yokohamensis* Crosse and *C. Reiniana* var., Kob., Jahrb. iii, Pl. 5, f. 8).  
Yokohama (Crosse); Hakone Mountains (Schmacker); Mikuriya, Suruga; Gojo and Kambe, Yamato; Kobé, Setsu; Kashima, Harima.  
Form TINCTILABRIS Pils. Nachi and Tomisato, Kii (Hirase).  
Var. REINIANA Kobelt. Ibuki, Omi (Hirase); Aichi (U. S. Nat. Mus.).
- C. MITSUKURII Pils. Tomisato, Kii.<sup>2</sup>
- C. DUCALIS Kob. "Interior of Nippon" (Rein); Miya-mura, Hida (Hirase).  
Var. DORCAS Pils. Kiyomi-mura, Hida (Hirase).
- C. VASTA Bttg. Nagasaki (Rein, Schmacker); Seluchi (Rein); Fukuregi, Higo (Hirase).
- C. FULTONI Sykes. Shikoku: Kinnayama, type locality; Ushirogawa, Tosa; Nametoko, Iyo; Goto, Uzen (Hirase).
- C. HIRASEANA Pils. Okinoshima, Tosa, Shikoku (Hirase).

Section HEMIPHLEDUSA Bttg.

Group of *C. validiuscula*.

- C. DECUSSATA v. Mart. Tsukuba-san, a mountain in Hitachi Province, north of Tokyo (Hilgendorf). A species of uncertain position in the system.
- C. VALIDIUSCULA v. Mart. Seluchi, Kiushiu (Rein).  
Var. BILAMELLATA Bttg. "Seluchi, between Hiuga and Bugo" (Rein).
- C. INTERLAMELLARIS v. Mart. Kiushiu.
- C. ETHIOPS Mlldff. Near Nagasaki, Kiushiu.
- C. VIRIDIFLAVA Bttg. "Interior of Japan," "Kiushiu" (Rein).

<sup>2</sup> Smaller than *Martensi*; somewhat Buliminus-shaped. Whorls  $9\frac{1}{2}$ , the upper ones not amputated. Aperture about as in *Martensi*. Length 29, diam. 8 mm.

- C. HICKONIS* Bttg. "Interior of Nippon" (Rein).  
 Var. *BINODIFERA* Bttg. "Interior of Nippon" (Rein).  
*C. NOLANI* Pils. Fukura and Ikari, Awaji (Hirase).  
*C. GRACILISPIRA* Mlldff. Near Kobé, Setsu.  
*C. CARYOSTOMA* Mlldff. Kobé, Setsu.  
 Var. *JAYI* Pilsbry. Jo, Kii (Hirase).  
*C. TOSANA* Pils. Ushirohawa, Tosa, and Nametoko, Iyo,<sup>3</sup> Shikoku Island.  
*C. GRACLE* Pils. Nachi, Kii (Hirase, No. 794).

*Group of C. sublunellata.*

- C. SUBLUNELLATA* Mlldff. Nikko Mountains (Hungerford).  
*C. HETEROPTYX* Pilsbry. Tomisato and Nachi, Kii (Hirase).  
*C. OPEAS* Mlldff. Nikko Mountains (Hungerford).  
*C. MICROPEAS* Mlldff. Nikko (Hungerford); Mikuriya, Suruga (Hirase).  
 Var. *PERPALLIDA* Pils. Nishigo, Uzen.  
 Var. *HOKKAIDOENSIS* Pils. Kayabe, Ojima, Hokkaido.  
*C. SUBULINA* Mlldff. Nikko Mountains and Lake Chusenji, Shimotsuke.  
 Var. *LEUCOPEAS* Pilsbry. Ikoma and Samotonakamura, Kii (Hirase).  
*C. SERICINA* Mlldff. Lake Chusenji, Shimotsuke and Yumagaishi (Hungerford).  
 Var. *RHOPALIA* Pilsbry. Mikuriya, Suruga (Hirase).

*Group of C. hyperolia.*

- C. HYPEROLIA* v. Mart. Uweno, near Yeddo (Hilgendorf, type locality). Oshima, Izu; Mikuriya, Suruga (Hirase).  
 Var. *RECTALUNA* Mlldff. Kamatokogiro.  
 Var. *APTYCHIA* Mlldff. Hakone and Chusenji.  
 Var. *PLANULATA* Mlldff. Kobé.

*Group of C. awajiensis.*

- C. AWAJIENSIS* Pils. Fukura, Awaji.  
*C. HARIMENSIS* Pils. Kashima, Harima; Shirono, Buzen.

<sup>3</sup>In the specimens of *C. tosanai* from Nametoko, Iyo, the intermediate palatal plicae coalesce to form a somewhat I-shaped lunella. They are a transition form to the group of *C. antucophora*.

- C. PERIGNOBILIS Pils. Okinoshima, Tosa; Dogo, Iyo.  
 C. KOCHIENSIS Pils. Kochi, Tosa; Minamata and Yatsushiro,  
 Higo; Togo, Satsuma. (*C. higoensis* Pils. is a synonym.)  
 C. SUBAURANTIACA Pils. Deyai and Toyonishihami, Nagato.  
 C. ISCHINA Pils. Kochi, Tosa, Shikoku Island.  
 Var. NEPTIS Pils. Kochi, Tosa.  
 C. IGNOBILIS Sykes. Kinnayama, Shikoku.  
 C. SHIKOKUENSIS Pils. Ushirohawa, Tosa, Tairiujii, Awa, and  
 Nametoko, Iyo, Shikoku Island.  
 C. STRICTALUNA Bttg. Nagasaki (Lischke).  
 Var. MAJOR Bttg. Seluchi, between Hiuga and Bugo (Rein).  
 Var. NANA Mildff. Nagasaki.

*Group of C. aulacophora.*

- C. AULACOPHORA Pils. Fukura, Awaji (*C. breviluna* Mildff.).  
 C. PIGRA Pils. Kashima, Harima (Hirase).

*Group of C. platyauchen.*

- C. PLATYAUCHEN v. Mart. (*C. fusangensis* Mildff.). Tsukubasan, a mountain north of Tokyo (Hilgendorf, type locality); Lake Chusenji (Schmacker); Nishigo, Uzen; Mikuriya, Suruga (Hirase); Prov. Suruga (F. Stearns); Prov. Yamato (Rein).  
 C. ATTRITA Bttg. Japan (Rein); Ibuki, Omi, and Kiyomimura, Hida (Hirase).  
 Var. INFAUSTA Pils. Nachi, Ikoma, and Jo, Prov. Kii (Hirase).<sup>4</sup>  
 C. HAKONENSIS Pils. Hakone Mountains (B. Schmacker); Oshima, Izu (Hirase).  
 C. SCHMACKERI Sykes. Kinnayama (Sykes); Kochi, Tosa (Hirase); Shikoku Island.  
 C. BUSCHII Küster. Japan (Siebold). Position uncertain.  
 C. PLATYDERA v. Mart. Kobé (Schmacker); Prov. Yamato, at Gose, Matsunotoge, Kambe and Nara, and Heisan, west of Lake Biwa (A. Gulick!).  
 Var. LAMBDA Bttg. Japan (Rein); Nohara, Yamato (Hirase).

<sup>4</sup>Somewhat smaller than *attrita*; the subcolumnellar lamella immersed, inferior lamella continued inward decidedly farther than the spiral lamella. Other characters substantially as in *attrita*.

Var. *KIENSIS* Pils. Kurozu, Nachi and Tomisato, Prov. Kii (Hirase).<sup>5</sup>

*Group of C. ptychochila.*

*C. BERNARDII* Pfr. [Siam? Riukiu Islands?]

*C. CRENILABIUM* Pils. Prov. Kunchan, Okinawa (Hirase).

*C. PTYCHOCHILA* Bttg. [China? Riukiu Islands?]

*C. EXCELLENS* Pfr. (*C. proclara* Gld. preoc.). Okinawa (U. S. N. P. Exp.).

*Group of C. Pinto.*

*C. PINTO* Pils. Tane-ga-shima, Osumi (Hirase).

*C. PTYCHOCYMA* Pils. Tane-ga-shima, Osumi (Hirase).

Var. *YAKUSHIME* Pils. Yaku-shima, Osumi (Hirase).

*Group of C. munus.*

*C. MUNUS* Pils. Oshima, in the Riukiu Islands (Hirase).

Section *ZAPTYX* Pilsbry.

*C. HIRASEI* Pils. Kagoshima and Sakura Island, Satsuma (Hirase).

Var. *RIKAIENSIS* Pils. Kikaigashima, Osumi (Hirase, Nos. 557, 557*b*).

*C. HYPEROPTYX* Pils. Okinawa; Yaeyama (Hirase).

*C. HACHIJOENSIS* Pils. Hachijo Island, Izu.

Section *TYRANNOPHELEDUSA* Pilsbry.

*Group of C. mikado.*

*C. MIKADO* Pils. (*C. omiensis* Mlldff.). Ibuki, Omi, and Akasaka, Mino (Hirase).

*C. IOTAPTYX* Pils. Ibuki and Ryozen,<sup>6</sup> Omi (Hirase).

Var. *CLAVA* Pils. Senzan. Awaji; Ikoma, Kii (Hirase).

*C. ORTHATRACTA* Pils. Akasaka, Mino (Hirase).

<sup>5</sup> Smaller than *platydera*; more swollen below and more attenuate above. Whorls 8½-10. Length 16-17, diam. 4½ mm.

<sup>6</sup> Specimens of *C. iotaptyx* from Ryozen, Omi, have 12 to 13 whorls, but otherwise are like the types from Ibuki, Omi. The shells from Ikoma, Kii, are somewhat intermediate between *iotaptyx* and *clava*, but nearer the latter.

- C. AURANTIACA* Bttg. "Interior of Nippon" (Rein); Kobé (Schmacker); Nachi, Kii, Ikari, Awaji, and Suimura, Awa (Hirase).  
 Var. *HYPOPTYCHIA* Pils. Kashima, an island near Tanabe, Kii (Hirase).<sup>7</sup>  
 Var. *ERBERI* Bttg. (*minor* Mlldff.). Nara, Nohara and Gojo, Yamato; Chikubushima, in Lake Biwa; Kashima, Harima; Tomisato, Aiga, and Kurozu, Kii (Hirase).

*Group of C. bilabrata.*

- C. PLECLABRIS* A. Ad. Tanabe, Kii. (Subgeneric position doubtful.)  
*C. BILABRATA* Smith. Kobé, type locality; southern half of Nippon; Shikoku, Kiushiu and Iki Islands.  
 Var. *PTYCHOLEMA* Bttg. "Seluchi, between Hinga and Bugo" (Rein).  
*C. OSCARIANA* Pils. Fukuregi, Higo, Kiushiu (Hirase).  
*C. SURUGENSIS* Pils. Mikuriya, Suruga (Hirase).

*Group of C. tanegashimae.*

- C. OXYCYMA* Pils. Kagoshima, Satsuma, in southern Kiushiu (Hirase).  
*C. TANEGASHIMAE* Pils. Tane-ga-shima and Yaku-shima, Osumi (Hirase).

Section *LUCHUPHÆDUSA* Pilsbry.

- C. CALLISTOCHILA* Pils. Prov. Kunchan, Okinawa (Hirase).  
*C. MIMA* Pils. Oshima, Riukiu Islands (Hirase).  
*C. NESIOTHAUMA* Pils. Oshima, Riukiu Islands (Hirase).  
*C. OSHIMAE* Pils. Nase, Oshima (Hirase).  
*C. PSEUDOSHIMAE* Pils. Furuniya, Oshima (Hirase).

Section *STEREOPHÆDUSA* Bttg.

*Group of C. valida.*

- C. VALIDA* Pfr. Okinawa.  
 Var. *FASCIATA* Sykes. Okinawa.  
 Var. *PERFASCIATA* Pils. Prov. Kunchan, Okinawa.  
 Var. *STRIATELLA* Pils. Okinawa.

<sup>7</sup>Larger than *aurantiaca*, with narrower, less developed lip, more whorls, and several plicæ in the subcolumellar region.

*Group of C. japonica.*

- C. JAPONICA* Crosse. Middle and southern Nippon; Awaji and Shikoku Islands. (Includes *C. kobensis* Smith, type loc. Kobé; *C. nipponensis* Kobelt; and *C. eurystoma* v. Mart., type loc., Tsukuba-san, a mountain north of Yeddo, in Hitachi Province, Hilgendorf.)
- Var. *PALLENS* Mlldff. "Koma-kasunga."
- Var. *PEROBSCURA* Pils. Shirono, Buzen (Hirase).
- Var. *INTERPLICATA* Pils. Nishigo, Uzen; Takeya, Idzumo; Ryozen, Omi (Hirase).
- C. HILGENDORFI* v. Mart. Prov. Idzumo (Hilgendorf).
- C. OOSTOMA* Mlldff. Hakone (? *C. japonica* var. *suruga* Pils. + *C. eurystoma* subsp. *brachyptychia* Mlldff., both from Mikuriya, Suruga; also occurs at Kashiwa, Awaji).
- C. SUBJAPONICA* Pils. (= *C. fultoni* subsp. *clavula* Mlldff.). Ibuki, Omi; Tomisato, Kii (Hirase).

*Group of C. brevior.*

- C. BREVIOR* v. Mart. (*C. tetraptyx* Mlldff.). Misaki, Sagami (Hilgendorf); Yokohama (Schmacker); Tokyo (Stearns); Nikko, Shimotsuke (Loomis); Oshima, Izu, and Goto, Uzen (Hirase).
- C. NIKKOENSIS* Mlldff. Near Nikko (Eastlake).
- C. HONDANA* Pils. Coast of Prov. Suruga (F. Stearns).
- C. JACOBIANA* Pils. Tane-ga-shima and Yaku-shima, Osumi (Hirase).
- C. ADDISONI* Pils. Provinces Satsuma and Higo, Kiushiu.
- C. SEARNSII* Pils. Okinawa; Yayama (Hirase, Stearns).
- C. STEREOOMA* Pils. Yakushima, Osumi, south of Kiushiu.
- Var. *COGNATA* Pils. Tane-ga-shima, Osumi, south of Kiushiu.
- Var. *NUGAX* Pils. Yaku shima.

*Group of C. entospira.*

- C. ENOSPURA* Pils. Tane-ga-shima (Hirase).

## Section PSEUDONEXIA Boettger.

- C. SIEBOLDI* Pfr. Kashiwashima, Tosa; Toyonishikami, Nagato; Sasebo, Hizen; Yatsushiro, Higo (Hirase).

## Section EUPHLEDUSA Boettger.

*Group of C. jos.*

- C. SUBGIBBERA Bttg. Japan.  
 C. EXPANSILABRIS Bttg.  
   Var. STROPHOSTOMA Bttg. Interior of Nippon (Rein).  
   Var. NANA Bttg. Interior of Nippon (Rein).  
 C. ONCAUCHEN Mlldff. Tsu-shima (Fruhstorfer).

*Group of C. shanghaiensis.*

- C. ACULUS Bens. Nagasaki (Rein); also China.  
 C. DIGONOPTYX Bttg. "Interior of Nippon" (Rein); Manabe,  
   Hitachi; Takasaki, Kozuke; Yamaguchi, Tajima; Nishigo,  
   Uzen.  
 C. TAU Bttg. (*C. proba* Mlldff., 1885, not A. Ad.). Kyoto  
   (Rein, Hirase); Nohara and Gojo, Yamato; Takasaki,  
   Kozuke (Hirase); Tokyo; Yokohama.  
 C. COMES Pils. Kashima, Harima (Hirase).  
 C. TRYONI Pils. Hachijo Island, Izu (Hirase).

*Group of C. Hungerfordiana.*

- C. HUNGERFORDIANA Mlldff. Nara, Yamato.  
 C. MONELASMUS Pils. Kayabe, Ojima, Hokkaido.

*Group of C. euholostoma.*

- C. EUHOLOSTOMA Pils. Mikuriya, Suruga (Hirase).  
 C. HOLOTREMA Pils. Nachi, Kii (Hirase).<sup>8</sup>

## Section REINLA Kobelt.

- C. VARIEGATA (A. Ad.). "Tago" (A. Ad.); Uweno, near  
   Tokyo; Tokyo; Takasaki, Prov. Kozuke; Hirado, Hiizen.  
   Var. NESTOTICA Pils. Hachijo Island, Izu.

<sup>8</sup> *C. holotrema* resembles *C. euholostoma*, but is larger, purplish-brown with a yellow belt below the sutures, the base yellowish. Principal and palatal plicae longer. Whorls  $8\frac{1}{2}$ . Alt. 12, diam. 3.2 mm.

*Species of unknown subgeneric position.*

The following forms have been too imperfectly characterized to permit their reference to subgeneric groups:

- C. CINCTICOLLIS* Ehrmann. Province Tosa, Shikoku.  
*C. CRASSILAMELLATA* Ehrmann. Province Tosa, Shikoku.  
*C. GOULDII* A. Adams. Tago.  
*C. LIMBE* Ehrmann. Province Tosa, Shikoku.  
*C. LIRULATA* A. Adams. Mososeki.  
*C. NODULIFERA* v. Mart. Nippon, probably from near Yeddo (Dönitz). Based upon a single, perhaps abnormal, specimen.  
*C. PINGUIS* A. Adams. Kino-o-sima.  
*C. PROBA* A. Adams. Kino-o-sima.  
*C. SPRETA* A. Adams. Tago.  
*C. STENOSPIRA* A. Adams. Kino-o-sima.  
*C. STIMPSONI* A. Adams. Tsu-sima and Awa-sima.

## APPENDIX.

The following species have been received since the preparation of the foregoing list, bringing the number of recognized species to 99, with 37 subspecies or varieties; exclusive of 11 species of indeterminate position, enumerated above.

## Section HEMPILEDUSA Bttg.

- C. SUBIGNOBILIS* Pils.<sup>9</sup> Hirado, Hizen (Y. Hirase).  
*C. TANTILLA* Pils.<sup>10</sup> Goto, Uzen (Y. Hirase).

<sup>9</sup> *C. subignobilis* n.sp. Rather stout, fusiform, light brown, lightly striate, composed of 9½ whorls. Spire strongly attenuated above, the apex small. Aperture subtrapezoidal, the lip reflexed and thickened. Superior lamella rather small, inferior very deeply receding, subcolumellar emerging. Principal plica rather short. Lunella lateral, arcuate or bow-shaped. Length 15, diam. 3.3 mm. Like *C. ignobilis* Sykes, but with smaller early whorls.

<sup>10</sup> *C. tantilla* n.sp. Small, brownish, fusiform, striatulate, the last whorl distinctly striate; whorls 8, the second rather large. Aperture small, squarish-ovate, the lip well reflexed, somewhat thickened. Superior lamella small, inferior deeply receding, subcolumellar either immersed or emerging. Lunella oblique, united above with the middle of a short upper palatal plicæ. Length 9.5, diam. 2.5 mm.

*C. AULACOPOMA* Pils.<sup>11</sup> Hirado, Hizen (Y. Hirase).

*C. BIGENERIS* Pils.<sup>12</sup> Goto, Uzen (Y. Hirase).

Section TYRANNOPHLEDUSA Pils.

*C. DALLI* Pils.<sup>13</sup> Tairiuji, Awa, Shikoku Island (Y. Hirase).

Section STEREOPILELUSA Bttg.

*C. UNA* Pils.<sup>14</sup> Goto, Uzen (Y. Hirase.)

<sup>11</sup> *C. aulacopoma* n.sp. Fusiform, slowly tapering above to a subacute apex, light reddish-brown, weakly striatulate, the last whorl somewhat produced forward. Whorls  $9\frac{1}{2}$ . Aperture piriform, the lip well reflexed, thickened. Superior lamella low; inferior deeply receding; subcolumellar emerging to the lip-edge. Principal plica long. Upper palatal plica short, joined in the middle to the lunella, which is curved inward below (j-like), with a nodule at its inner termination. Clausilium somewhat spout-like distally, but wider there than in species of the *ptychochila* group.

<sup>12</sup> *C. bigeneris* n.sp. About the size and shape of *C. ignobilis*; pale-brownish, faintly striate. Subcolumellar lamella immersed; lip broadly reflexed. Principal plica rather short, dorsal and lateral; upper palatal plica oblique, almost joined in the middle to a long, slender lunella, the lower end of which curves far inward. Length 14.3, diam. 3.5 mm.

<sup>13</sup> *C. Dalli* n.sp. With the general form of *C. mikado*, the aperture is much as in *C. iotuptyx*. Whorls 14 to 16. The subcolumellar lamella emerges strongly, and sometimes the lip is puckered above it. Lunella as in *C. bilabrata*. Length 18.5, diam. 4 mm. This exceedingly peculiar many-whorled Clausilia belongs to the group of *C. bilabrata* by its palatal armature, but in contour it resembles species of the group of *C. mikado*.

<sup>14</sup> *C. una* n.sp. General contour of *C. oostoma* Mlldf., pale yellowish-corneous, striate. Whorls  $11\frac{1}{2}$ . Entire interlamellar margin of the lip closely and deeply plicate. Upper palatal plica short, oblique; lower long and arcuate, a short, rudimentary lunella rising from it. An extraordinary *Stereophaedusa*, with interlamellar plication like *Luchuphaedusa callistochila*.